REMARKS

I. Introduction

By the present Amendment, claims 1-3 and 13-15 have been amended. No claims have been added or cancelled. Accordingly, claims 1-20 remain pending in the application. Claims 1 and 13 are independent.

II. Office Action

In the Office Action of November 9, 2010, claims 1-4, 6-8, 11-16, and 18-20 were rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 6,193,660 issued to Jackson et al. ("Jackson"). Claims 5 and 17 were rejected under 35 USC §103(a) as being unpatentable over Jackson in view of U.S. Patent No. 5,874,830 issued to Hossack et al. ("Hossack"). These rejections are respectfully traversed.

III. Allowable Subject Matter

The Examiner's indication that claims 9 and 10 would be allowable, if rewritten in independent form to include all the limitations of the base claim and any intervening claims, is noted with appreciation.

IV. Rejections under 35 USC §102

Claims 1-4, 6-8, 11-16, and 18-20 were rejected under 35 USC §102(b) as being anticipated by Jackson. Regarding this rejection, the Office Action indicates that Jackson discloses an ultrasonograph system and method that includes an ultrasonogram generating portion for generating an ultrasonogram based on a reflection echo signal, a monitor screen for displaying the generated ultrasonogram, a display-body image portion for generating an image of a display body

superimposed on the ultrasonogram, and means for storing a first display position. The Office Action further indicates that Jackson discloses an input portion for inputting the amount of movement of the display body, calculation means for determining the second display position of the display body, and means for moving the display body from the first display position to the second display position. Applicants respectfully disagree.

By the present Amendment, Applicants have amended independent claim 1 to better define the invention by incorporating some of the features previously recited in claim 3. As amended, independent claim 1 defines an ultrasonograph that comprises:

> an ultrasonogram generating portion for generating an ultrasonogram based on a reflection echo signal obtained by radially scanning a specimen irradiated with an ultrasonic beam and a display area;
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> a monitor screen for displaying the generated ultrasonogram;
>
> a display-body image generating portion for generating an image of a display body superimposed on the ultrasonogram;
>
> means for storing a first display position of the display body displayed on the monitor screen;
>
> an input portion for inputting the amount of movement of the display body from the first display position to a second display position;
>
> calculation means for determining the second display position of the display body based on the amount of movement input from the input portion and the display area; and
>
> means for moving the display body from the first display position to the second display position determined by the calculation means, wherein
>
> the calculation means decomposes the amount of movement input from the input portion into a component in the direction of an ultrasonic beam line of the ultrasonogram and a component orthogonal to the former component,
>
> the ultrasonic beam line of the second display portion is determined based on the component orthogonal to the former component, and

the depth position on the ultrasonic beam line of the second display position is determined based on the component in the direction of the ultrasonic beam line.

The ultrasonograph of independent claim 1 includes an ultrasonogram generating portion, a monitor screen, a display-body image generating portion, means for storing, an input portion, calculation means, and means for moving. The ultrasonogram generating portion generates an ultrasonogram based on a reflection echo signal that is obtained by radially scanning a specimen irradiated with an ultrasonic beam and a display area, and the monitor screen is used to display the generated ultrasonogram. The display-body image generating portion generates an image of a display body superimposed on the ultrasonogram. The means for storing stores a first display position of the display body that is displayed on the monitor screen, and the input portion is used to input the amount of movement of the display body from the first display position to a second display position. The calculation means determines the second display position of the display body based on the amount of movement that is input from the input portion and the display area. The means for moving moves the display body from the first display position to the second display position which has been determined by the calculation means.

According to independent claim 1, the calculation means decomposes the amount of movement input from the input portion into a component in the direction of an ultrasonic beam line of the ultrasonogram and a component that is orthogonal to the former component. The ultrasonic beam line of the second display portion is then determined based on the component orthogonal to the former component, and the depth position on the ultrasonic beam line of the second display position is determined based on the component in the direction of the ultrasonic beam line.

As discussed in the Specification, the display body image is stored with the address and depth of a beam line and display. The calculation portion (25) then determines the amount of movement that is input with reference to the beam line and depth prior to movement, and resolves it into a component in the direction of the ultrasonic beam line and a component orthogonal to that direction. An ultrasonic beam line subsequent to movement is determined based on the resolved orthogonal components. The position of the depth in the ultrasonic beam line after movement is then determined based on the resolved component in the direction of the ultrasonic beam line, thereby displaying the position of the display body after movement is changed. See paragraph [0042] of the published application. According to such an arrangement, the movement of the B-mode image (e.g., the Doppler sample gate on the B-mode image) can be determined close to the direction of movement of the trackball thereby providing a natural feel to the operator. Additionally, it becomes possible to improve measurement by locating the central position of the display-body image on the ultrasonic beam line.

The Office Action alleges that Jackson discloses all of the features recited in independent claim 1. With respect to claim 3, the Office Action goes on to assert that Jackson discloses the calculation means which decomposes the amount of movement input from the input portion into a component in the direction of the ultrasonic beam line, and that the ultrasonic beam line of the second display portion is determined based on the component orthogonal to the former component. The Office Action goes on to assert that Jackson further discloses the depth position of the ultrasonic beam line of the second display position being determined based on the component in the direction of the ultrasonic beam line. Applicants' review of Jackson, however, suggests otherwise.

Jackson discloses a system for determining the location of a region of interest (ROI) throughout a sequence of images wherein a user identifies an ROI associated with anatomy represented in an image, and data associated with the ROI is compared with data from other or subsequent images. A maximum degree of correlation between the data associated with the ROI and the subsequent image is determined, and a translation associated with the maximum correlation is used to determine the position of an ROI designator in the subsequent image.

Contrary to the assertions made in the Office Action, Jackson never discusses decomposition of the amount of movement input into two (2) components that are orthogonal to each other. The cited figures (Figs. 2A to 2D) merely illustrate representations of displays of ultrasound images and associated ROIs. See column 2, lines 1-2. Jackson goes on to indicate that the ultrasound system (20) generates frames of data that correspond to an ultrasound image. Each frame data can also be in the form of a sector format which is shown in Figs. 2A – 2D. See column 4, lines 19-22.

The Office Action goes on to identify elements 26 and 36 of Fig. 1 to support the rejection. Element 26, however, illustrates a data processor that is used to generate intensity data for B-mode or M-mode imaging, as well as velocity/variance data representative of tissue motion or blood flow. See column 2, line 63 to column 3, line 11. Furthermore, reference numeral 36 only identifies a memory that is associated with a processor for determining the position of ROIs. See column 4, lines 13-18. Jackson further discloses a flowchart (See Fig. 5) which represents derivation of one or more quantities as a function of the ROI tracking. This can be done, in part, by using the correlation between images and adjusting the ROIs by moving or rotating the identified ROI using a manipulation device such as a trackball.

See column 10, line 48 to column 11, line 15. Jackson simply fails to provide any disclosure for features now recited in independent claim 1, such as:

> the calculation means decomposes the amount of movement input from the input portion into a component in the direction of an ultrasonic beam line of the ultrasonogram and a component orthogonal to the former component,
>
> the ultrasonic beam line of the second display portion is determined based on the component orthogonal to the former component, and
>
> the depth position on the ultrasonic beam line of the second display position is determined based on the component in the direction of the ultrasonic beam line.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 2-12 depend from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 1. In addition, these claims each introduce novel elements that independently render them patentable over the art of record. In particular, claim 3 explicitly discloses that the amount of movement from the input portion is in the form of XY Cartesian coordinates, and that the calculation means decomposes the amount of movement in terms of XY Cartesian coordinates. Again, these features are not shown or even suggested by the art of record.

As amended, independent claim 13 defines a method for controlling movement of a display body of an ultrasonograph that comprises the steps of:

> generating an ultrasonogram based on a reflection echo signal obtained by radially scanning a specimen irradiated with an ultrasonic beam and a display area;
>
> displaying the generated ultrasonogram on a monitor screen;
>
> generating an image of a display body superimposed on the ultrasonogram;

storing a first display position of the display body displayed on the monitor screen;

inputting an amount of movement to a second display position from the first display position of the display body;

calculating the second display position of the display body based on the input amount of movement and a display area; and

moving the display body from the first display position to the second display position, wherein

in the step of calculating, the amount of movement input from the input portion is decomposed into a component in the direction of an ultrasonic beam line of the ultrasonogram and a component orthogonal to the ultrasonic beam line, an ultrasonic beam line of a second display position is determined based on the component orthogonal to the ultrasonic beam line, and a depth position of the second display position on the ultrasonic beam line is determined based on the component in the direction of the ultrasonic beam line.

The method of independent claim 13 recites various steps which correspond to features of independent claim 1. In particular, the method includes calculation of a second display position of the display body based on the input amount of movement and a display area. Further, during the step of calculating, the amount of movement input from the input portion is decomposed into a component in the direction of an ultrasonic beam line of the ultrasonogram and a component orthogonal to the ultrasonic beam line. An ultrasonic beam line of a second display position is then determined based on the component orthogonal to the ultrasonic beam line. Next, a depth position of the second display position on the ultrasonic beam line is determined based on the component in the direction of the ultrasonic beam line. As previously discussed with respect to independent claim 1, such features are not shown or suggested by the art of record.

It is therefore respectfully submitted that independent claim 13 is allowable over the art of record.

Claims 14-20 depend from independent claim 13, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 13. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

V. Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 389.44944X00).

Respectfully submitted,
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